

# EXERCISES

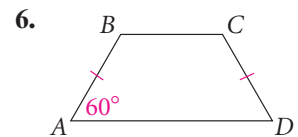
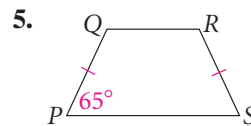
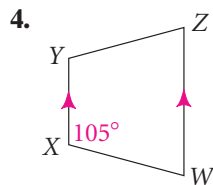
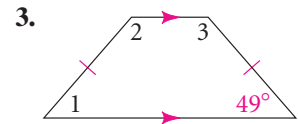
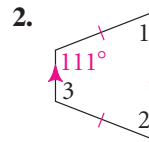
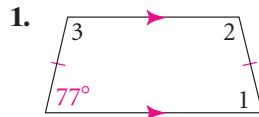
For more practice, see *Extra Practice*.

## Practice and Problem Solving

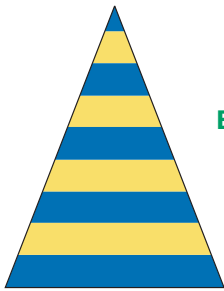
### A Practice by Example

**Example 1**  
(page 320)

Each trapezoid is isosceles. Find the measure of each angle.



**Example 2**  
(page 321)

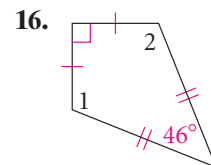
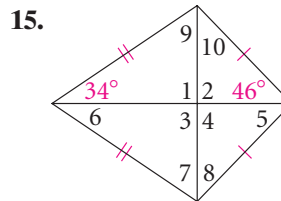
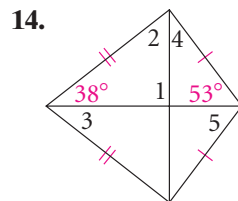
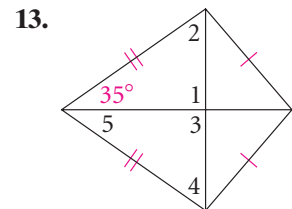
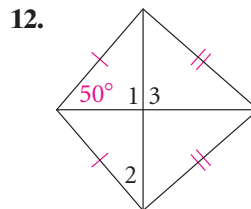
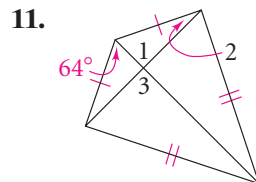
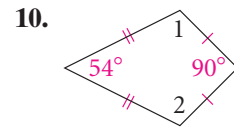
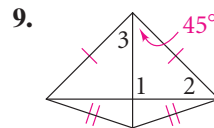
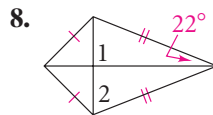


7. **Design** Each patio umbrella is made of eight panels that are congruent isosceles triangles with parallel stripes. A sample panel is shown at the left. The vertex angle of the panel measures 42.

- Classify the quadrilaterals shown as blue stripes on the panel.
- Find the measures of the quadrilaterals' interior angles.

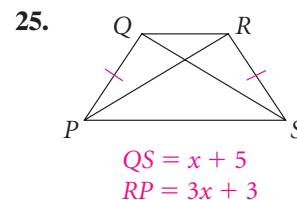
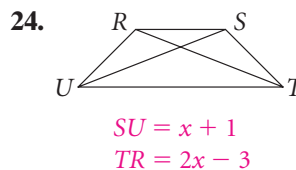
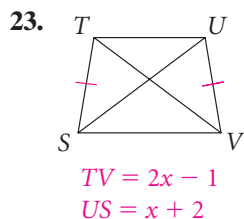
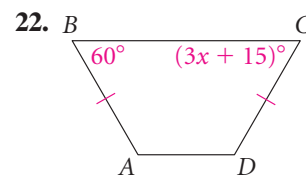
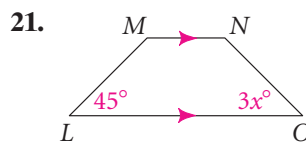
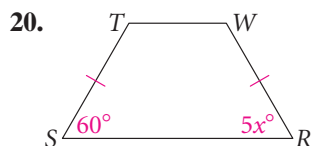
**Example 3**  
(page 322)

Find the measures of the numbered angles in each kite.



- Open-Ended** Sketch two kites that are not congruent, but with the diagonals of one congruent to the diagonals of the other.
- The perimeter of a kite is 66 cm. The length of one of its sides is 3 cm less than twice the length of another. Find the length of each side of the kite.
- Critical Thinking** If  $KLMN$  is an isosceles trapezoid, is it possible for  $\overline{KM}$  to bisect  $\angle LMN$  and  $\angle LKN$ ? Explain.

**B Apply Your Skills** **x<sup>2</sup> Algebra** Find the value of the variable in each isosceles trapezoid.



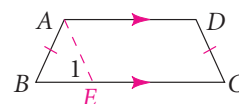
**Proof** 26. **Developing Proof** The plan suggests a proof of Theorem 6-15. Follow the plan and write a paragraph, two-column, or flow proof.

**Given:** Isosceles trapezoid  $ABCD$  with  $\overline{AB} \cong \overline{DC}$

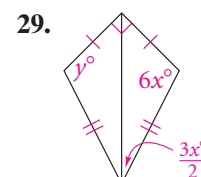
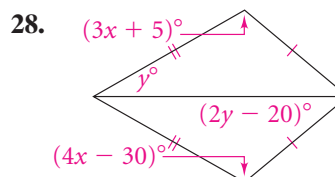
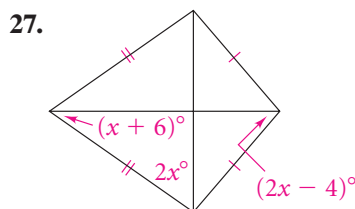
**Prove:**  $\angle B \cong \angle C$  and  $\angle BAD \cong \angle D$

**Plan:** Begin by drawing  $\overline{AE} \parallel \overline{DC}$  to form parallelogram  $AECD$  so that  $\overline{AE} \cong \overline{DC} \cong \overline{AB}$ .

$\angle B \cong \angle C$  because  $\angle B \cong \angle 1$  and  $\angle 1 \cong \angle C$ . Also,  $\angle BAD \cong \angle D$  because they are supplements of the congruent angles,  $\angle B$  and  $\angle C$ .



**x<sup>2</sup> Algebra** Find the value(s) of the variable(s) in each kite.



Exercises 30–31

**Bridge Design** A quadrilateral is formed by the beams of the bridge at the left.

30. Classify the quadrilateral. Explain your reasoning.

31. Find the measures of the other interior angles of the quadrilateral.

**Critical Thinking** Can two angles of a kite be as follows? Explain.

32. opposite and acute

33. consecutive and obtuse

34. opposite and supplementary

35. consecutive and supplementary

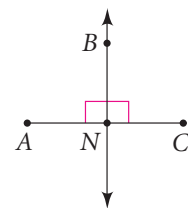
36. opposite and complementary

37. consecutive and complementary

**Writing** 38. A kite is sometimes defined as a quadrilateral with two pairs of consecutive sides congruent. Compare this to the definition you learned in Lesson 6-1. Are parallelograms, trapezoids, rhombuses, rectangles, or squares special kinds of kites according to the changed definition? Explain.

## C Challenge

39.  $\overleftrightarrow{BN}$  is the perpendicular bisector of  $\overline{AC}$  at  $N$ . Describe the set of points,  $D$ , for which  $ABCD$  is a kite.



- Proof** 40. Prove that the angles formed by the noncongruent sides of a kite are congruent. (*Hint: Draw a diagonal of the kite.*)

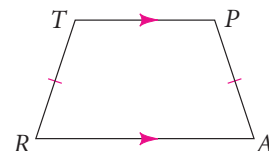
**Proof** Write a proof. Use the given figure with additional lines as needed.

41. **Given:** Isosceles trapezoid  $TRAP$  with  $\overline{TR} \cong \overline{PA}$

**Prove:**  $\angle RTA \cong \angle APR$

42. **Given:** Isosceles trapezoid  $TRAP$  with  $\overline{TR} \cong \overline{PA}$ ;  $\overline{BI}$  is the perpendicular bisector of  $\overline{RA}$  intersecting  $\overline{RA}$  at  $B$  and  $\overline{TP}$  at  $I$ .

**Prove:**  $\overline{BI}$  is the perpendicular bisector of  $\overline{TP}$ .



For a trapezoid, consider the segment joining the midpoints of the two given segments. How are its length and the lengths of the two parallel sides of the trapezoid related? Justify your answer.

43. the two nonparallel sides                      44. the diagonals



## Standardized Test Prep

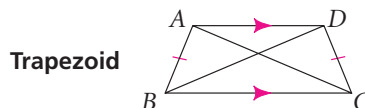
### Multiple Choice

45. Which statement is true for every trapezoid?  
 A. Exactly two sides are congruent.                      B. Exactly two sides are parallel.  
 C. Opposite angles are supplementary.                      D. The diagonals bisect each other.
46. Which statement is true for every kite?  
 F. Opposite sides are congruent.                      G. At least two sides are parallel.  
 H. Opposite angles are supplementary.                      I. The diagonals are perpendicular.

### Quantitative Comparison

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- A. The quantity in Column A is greater.  
 B. The quantity in Column B is greater.  
 C. The two quantities are equal.  
 D. The relationship cannot be determined from the information given.



Column A

Column B

47.	$m\angle ABC$	$m\angle BCD$
48.	$AC$	$BD$
49.	$AD$	$BC$



### Take It to the NET

Online lesson quiz at  
[www.PHSchool.com](http://www.PHSchool.com)

Web Code: afa-0605

### Short Response

50. Diagonal  $\overline{RB}$  of kite  $RHBW$  forms an equilateral triangle with two of the sides.  $m\angle BWR = 40$ . Draw and label a diagram showing the diagonal and the measures of all the angles. Which angles of the kite are largest?

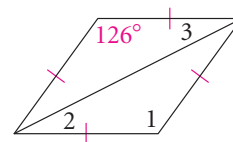
## Mixed Review

**Lesson 6-4** Find the indicated angle measures for the rhombus.

51.  $m\angle 1$

52.  $m\angle 2$

53.  $m\angle 3$

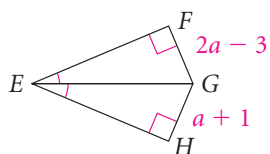


**Lesson 5-2**  $x^2$  **Algebra** Find the values indicated.

54. a.  $a$

b.  $FG$

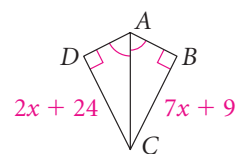
c.  $GH$



55. a.  $x$

b.  $CD$

c.  $BC$



**Lesson 4-2**

56. State the postulate that justifies the statement  $\triangle ABC \cong \triangle DEF$ .

